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EXAMINER

KALAFUT, STEPHEN J

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 01/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/837,740

Applicant(s)

MORRIS ET AL.

Examiner

Stephen J. Kalafut

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-13 is/are rejected.
- 7) ☒ Claim(s) 8-10, 14 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not). Misnumbered claim 14 (second occurrence) been renumbered 15.

Claims 8-10, 14 and 15 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim must depend from other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits. The phrase "2 and 7" renders claims 8-10 improper. Claim 14 is rendered improper by the phrase "7 or 8, and 13". Also, a multiple dependent claim cannot depend from another multiple dependent claim, so the dependency of claim 14 upon claim 8 renders claim 14 improper. Claim 15 depends on claim 14, and would thus likewise be improper.

Claims 1-7 and 11-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, the phrase "(valence III or V)" renders the claim indefinite because it is unclear whether the limitation(s) within the parentheses are part of the claimed invention. See MPEP § 2173.05(d). Limitations which are intended to denote the scope of a claim should not be placed in parentheses. The claims are confusing as to whether the "links" and "spacers" are the same component. The recitation of "molecular weight" in claims 2-7 is incomplete. Is this a number average, a weight average, or some other average? In claims

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11 and 12, the word "can" is confusing. Whether it actually requires the limitations recited immediately afterwards is unclear.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in–

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 6, 11 and 13 are rejected under 35 U.S.C. 102(a) and (c) as being anticipated by Watanabe *et al.* (US 6,180,287).

Watanabe *et al.* disclose a polymer electrolyte comprising an electrolyte salt and a polyether (column 2, lines 13-17), with linkages comprising two carbons, where the polyether has a molecular weight ranging from 1,000 to 1,000,000 (column 1, lines 48-67). The polyether may also include silicon-containing moieties (column 5, lines 40-54), where the silicon atom is connected to an alkoxy group, thus forming an oxy-silicon group. Thus, the polymer comprises alternating oxygen atoms and oxy-silicon groups connected by saturated alkyl linkages.

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Claims 1, 6, 11 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Ulrich *et al.* (US 6,472,104).

Ulrich *et al.* disclose a polymer electrolyte in which polyethylene oxide units are joined to oxy-silicon units (column 2, lines 43-62), which would result in a polymer where alternating oxygen atoms and oxy-silicon groups connected by saturated alkyl linkages. The polyethylene oxide units, each including two-carbon linkages, have molecular weights from 100 to 10,000 (column 3, lines 43-48), which would result in the overall polymer having an average weight falling in the present range of 200 to 1,000,000. The electrolyte also contains a lithium salt (column 3, line 64 through column 4, line 3).

Claims 1, 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen *et al.* (US 5,593,765).

Chen *et al.* disclose a polymer electrolyte made from dithiols, which contain internal oxygen, sulfur, or nitrogen atoms, or oxy-phosphorus groups (column 4, lines 14-35), and from divinyl ethers (column 4, lines 45-49), which would result in a polymer having oxygen and sulfur atoms, optionally with nitrogen atoms or oxy-phosphorus groups connected by saturated alkyl groups, including those with two carbons. The electrolyte also includes at least one salt (column 3, lines 51-53 and column 5, lines 37-65).

Claims 1, 3 and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Yasukawa *et al.* (US 4,798,773).

Yasukawa *et al.* disclose a polymer electrolyte including a salt and a silicon-containing polymer (column 1, line 63 through column 2, line 8). The polymer includes either polyethylene oxide or polypropylene oxide linkages (column 2, lines 11-24), where an oxygen atom within the linkage would be bonded to the silicon atom. Since there are at most three silicon atoms within each molecule (column 3, line 3), the molecular weight would be under 1,000,000, while the molecule would still include enough oxygen and carbon atoms to weigh more than 200. Thus, the polymer would include saturated alkyl linkages having two or three carbons, connecting alternating oxygen atoms and oxy-silicon groups. As seen in column 4, line 53 through column 5, line 27, the alkyl linkage may itself be branched. One of the branches would be a side chain having its own substituents, the other two branches forming the two ends of the main chain.

Claims 1, 5 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Chaloner-Gill (US 5,393,621).

Chaloner-Gill discloses a polymer electrolyte comprising an organophosphorus polymer having a number average molecular weight ranging from 1,000 to 80,000 and an inorganic salt (column 3, lines 13-34). The polymer includes oxy-phosphorus units (column 6, lines 8-49) connected by hydrocarbon or oxyhydrocarbon units (column 6, lines 36-38). These units would be saturated (column 7, lines 35-39). Thus, the polymer would include saturated hydrocarbon units connecting oxygen atoms and oxy-phosphorus groups.

Claims 1, 2 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Daroux *et al.* (US 5,648,186).

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Daroux *et al.* discloses polymer electrolytes which include a macromolecule having a weight above 10,000 (column 4, lines 53-55) and a salt (column 3, lines 34-49). The polymer includes polyethylene oxide branches connected to a core which contains nitrogen atoms connected by two carbons. Thus, the polymer includes two-carbon spacers connecting oxygen and nitrogen atoms. Since the degree of polymerization may be as low as 7 (column 9, lines 35-46), polymers with weights below 1,000,000 would be produced.

Claims 1, 2, 4 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacquet *et al.* (US 4,390,689).

Jacquet *et al.* discloses a polymer (column 1, line 7 through column 2, line 2) in which nitrogen atoms are connected to oxygen or sulfur atoms (column 1, line 45) via alkylene (*i.e.*, saturated hydrocarbon) groups which may be substituted (column 1, lines 22-24). The molecular weight ranges from 1,000 to 50,000 (column 3, lines 1-3).

Claims 1 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Cyba (US 3,598,855).

Cyba discloses polymers which include oxy-boron groups and nitrogen atoms optionally connected by saturated hydrocarbon spacers having one or two carbons (column 1, lines 20-40). The two-carbon spacer would meet present claim 11.

Claims 1, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Kolouch (US 5,312,814).

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Kolouch discloses polymers which include fluorocarbon spacers having two or three carbons, connecting oxygen atoms and oxy-phosphorus groups. The polymers may include functional substituents attached to the ends of side chains which contain these spacers, or not at the ends, which would form a further substituted side chain (column 2, lines 4-8). In Table 1, the monomer identified as "EVE-P" would include the above mentioned spacers and groups.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen *et al.* (above).

While Chen *et al.* disclose a polymer having oxygen and sulfur atoms, optionally with nitrogen atoms or oxy-phosphorus groups connected by saturated alkyl groups, including those with two carbons (as stated above), they do not disclose the molecular weights of their polymer. However, since the molecular weight would effect such properties as mechanical strength (which benefits from higher weight) and ionic conductivity (which benefits from lower weight), the average molecular weight of the polymers of Chen *et al.* would be a matter within the skill of the ordinary artisan, who would desire to obtain an electrolyte with an optimal combination of these various properties. These claims would thus be obvious over Chen *et al.*



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Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kolouch (above). Kolouch does not disclose a molecular weight for his polymer. However, his disclosure is concerned with various properties such as melt-flowability and adhesion (column 1, lines 33-38). Since molecular weight would have some effect on these macroscopic properties, determining an optimal molecular weight range for the polymers of Kolouch would be within the skill of the ordinary artisan. This claim would thus be obvious over Kolouch.


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hasegawa *et al.* (US 5,972,539) disclose solid electrolyte with a flame retardant having oxy-phosphorus groups.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is (703) 308-0433. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

sjk  
December 29, 2002

  
STEPHEN KALAFUT  
PRIMARY EXAMINER  
GROUP 1200